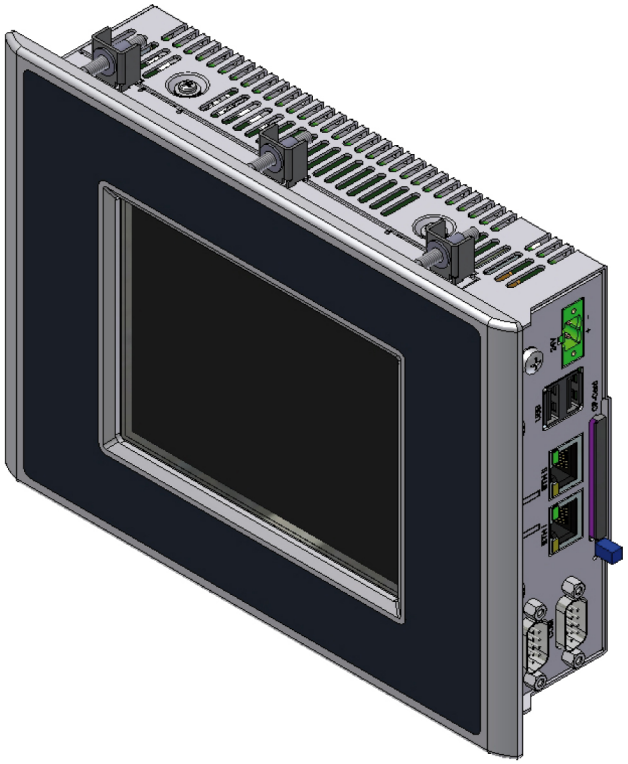
Operating instructions

CT205



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Translation of the original operating instructions

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1 Structure of safety and warning notices

This documentation contains safety and warning notices, indicating potential dangers and possible personal injury or damage to hardware and software. These warnings are structured as follows:

⚠ WARNING

Type and source of danger.

Potential consequence(s) if disregarded.

- Measure(s) to prevent danger.

➔ Result of the measure(s).

Symbols and terms used

Pictogram	Signal word	Meaning	Consequences if disregarded
	Warning	Hazardous situation	Personal injury or significant material damage
	Caution	Material damage	Damage to hardware and/or software
	-	Important note	Product handling information.
	-	Useful tip	

Tab. 1: Symbols and terms used

2 Safety instructions

The following basic safety instructions are intended to avoid personal injury and material damage. The operator must ensure that the basic safety instructions are adhered to.

Make sure that system and operating staff and any persons that work on the device under their own responsibility have completely read and understood the operating instructions.

In the event that something is unclear or if additional information is required, please contact your technical service representative at Bachmann electronic GmbH.

2.1 General

Never install or operate damaged products. Please report any defects immediately to the carrier.

Unapproved removal of required coverings, improper use, incorrect installation or operation may result in severe personal injury or material damage.

Unauthorized opening and incorrect repairs may result in defective devices or cause malfunctions that may cause danger to the user in connection with connected peripheral devices.

2.2 Target group

All work for the installation, startup, troubleshooting and maintenance must be performed by **qualified technicians** or Bachmann electronic GmbH authorized personnel (IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 and national accident prevention regulations must be adhered to).

A qualified technician in the sense of these basic safety instructions is a person who is familiar with the setup, installation, startup and operation of the product and who has the proper qualifications to perform these tasks.

The user of the device must have read the operating instructions and be familiar with all functions of the installed software that he has access to.

All work in the remaining areas of transport, storage, operation and waste disposal must be performed by persons who have been trained accordingly.

2.3 Intended use

The device was designed for installation in the front of switch cabinets of machine and system technology.

The operator must ensure that

- the device is only used for its intended purpose.
- the device is only operated in proper and functional condition.
- the technical description is always available in its complete version and in legible condition at the operating location of the device.
- only sufficiently qualified and authorized personnel will operate, maintain, and repair the device.
- this personnel is regularly instructed with regard to issues of work safety and environmental protection, and that this personnel is familiar with the technical description and especially the safety instructions it contains.

When installing the machines, the startup of the devices (which means during startup of proper operation) should not be performed until it is assured that the machines comply with the regulations, the EC Directive 98/37/EC (from 01/2010 2006/42/EC) (Machine Directive) EN 60204 must be adhered to.

The technical specifications and information about conditions for connection are stated on the type plate and in the documentation and must be observed without fail.

→ Chapter 3.1 "Type plate, customer label", Page OI-9

2.4 Electrical connection

When working on energized devices, all applicable national accident prevention regulations must be complied with.

The electrical installation must be performed according to the relevant regulations. The documentation contains additional instructions.

The device and its components must be supplied and operated with safety extra-low voltage (SELV) according to EN60950-1. It must be in compliance all requirements of EN60950-1, especially the fire protection regulations.

The documentation contains instructions for EMC-compliant installation, EMV, such as shielding, grounding, and installation of cables. The manufacturer of the system or the machine is responsible for compliance with the limit values required by EMV regulations.

Protective measures and protective equipment must comply with applicable statutory regulations.

Required protective measures: The device must be grounded.

→ *Chapter 4.4 "Grounding measures", Page OI-22*

2.5 Operation

The extinguishing of the operating LED and other status indicators does not indicate that the device is disconnected from power and is de-energized.

2.6 CE Directives

Bachmann electronic GmbH calls attention to the fact that CE compliance has to be verified again when working on assemblies or modules.

2.7 ESD protection

ESD: **E**lectro**s**tatic **D**ischarge
ESDS: **E**lectro**s**tatic **D**ischarge **S**ensitive

⚠ ATTENTION

Electrostatic discharge.
Components may be destroyed.
- Consider protective measures for ESD.

Correctly assembled ESDS devices are protected against ESD
Unassembled ESDS devices, particularly the interior parts (e.g. the mother board), can be damaged on contact due to ESD. During the handling of these ESDS devices (e.g. during assembly), protective measures for ESD should be observed.
The damage may only be noticeable after a prolonged operational time.

Protective measures

- Wear protective clothing against ESD
- Ground your work area
- Use ESD packaging

Identification

Identification for electrostatically sensitive devices

Fig. 1: ESD identification

3 Device configuration, system description

The device can be used as a pure operating and monitoring device but can also be used as a controller. When used as a controller, distributed analog and digital CAN slave I/O modules can be found via the integrated CAN interface connector on the device.

The system is ideally designed for Java visualizations using VxWorks®.

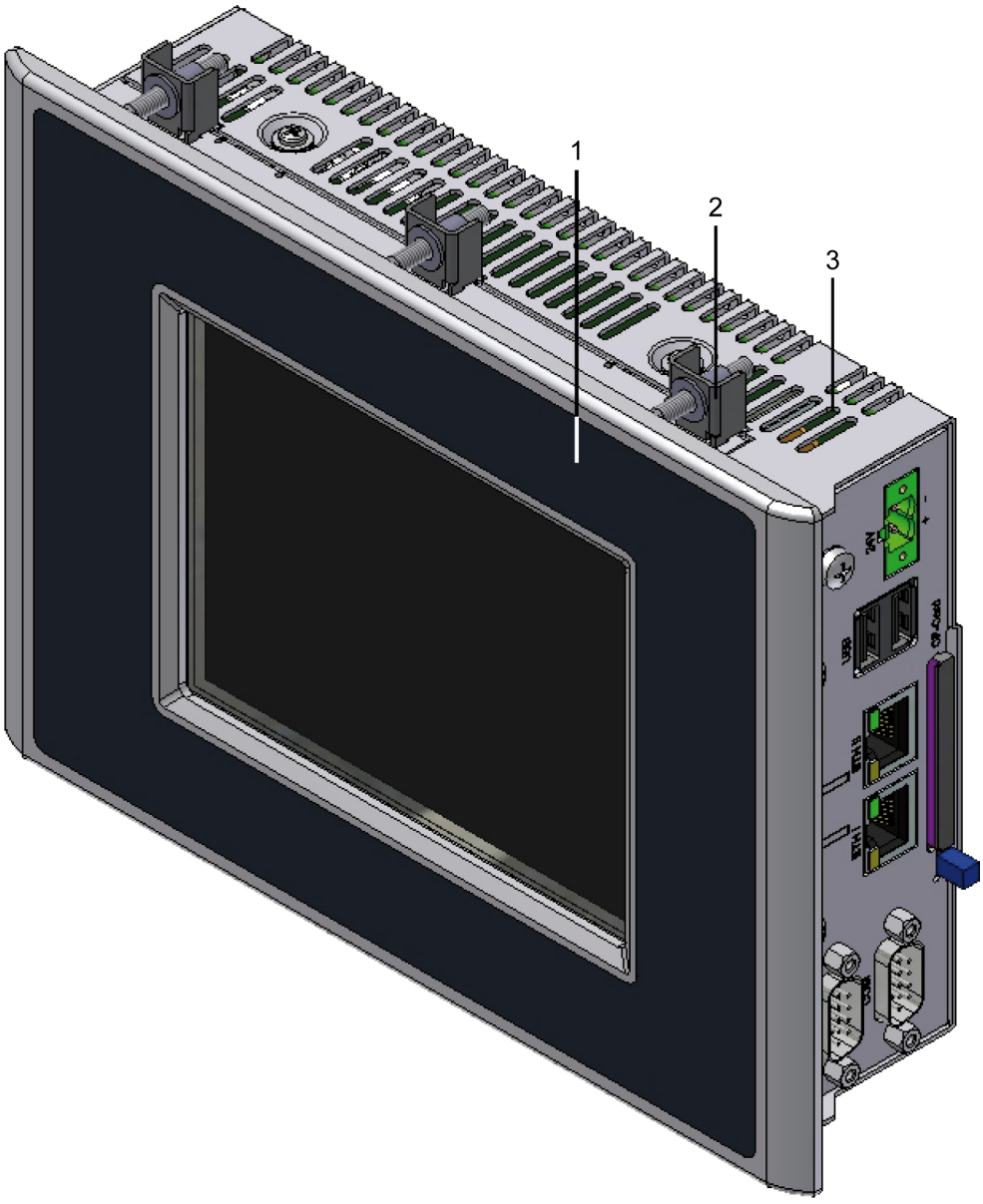


Fig. 2: Device configuration CT205

1) Front panel
2) Tensioning clamp
3) CPU module

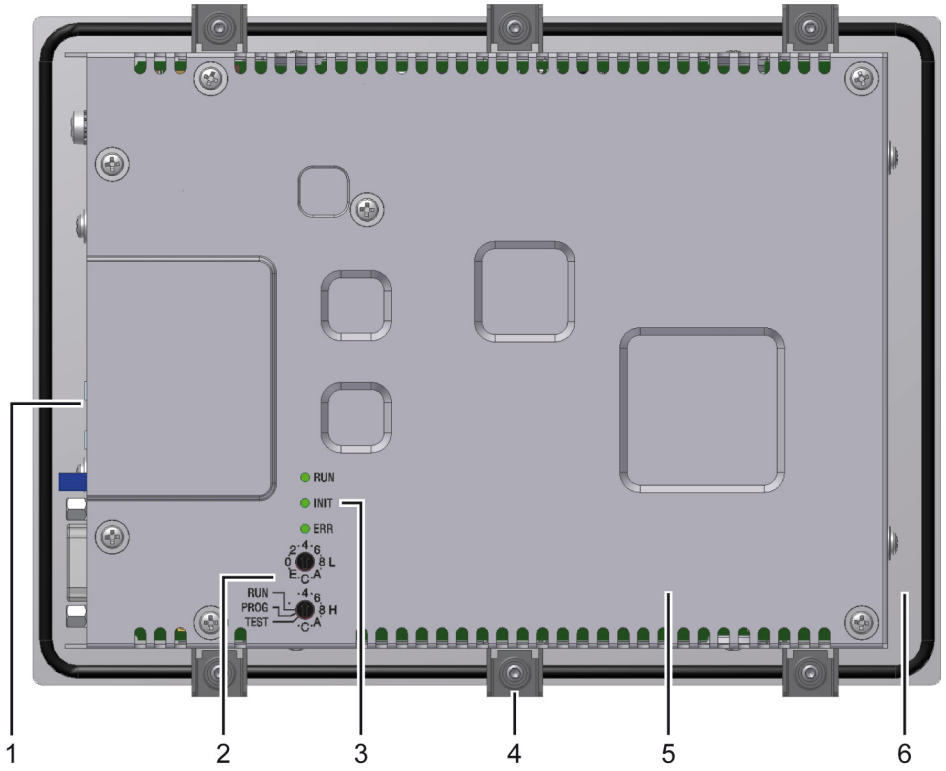


Fig. 3: Device configuration CT205

1)	Interfaces	→ *Chapter 3.2.2, Page OI-11*
2)	Hex rotary switches	→ *Chapter 3.2.2.5, Page OI-15*
3)	Status indication	→ *Table 12, Page OI-30*
4)	Tensioning clamp	
5)	CPU module	
6)	Front panel	

3.1 Type plate, customer label

Type plate

The type plate contains most important product specifications of the device.

- Ord.Nr. (Ordering number)

  → *Table 17 "Device equipment / Order number CT205", Page OI-39*

- Model (Product name)
- Type (Equipment)

  → *Table 17 "Device equipment / Order number CT205", Page OI-39*

- Supply (Supply voltage; power consumption)
- SN (Serial number)

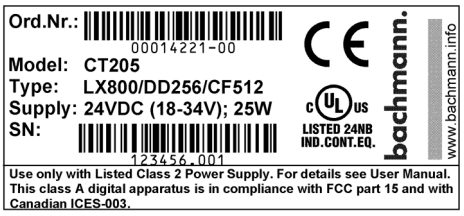

Ord.Nr.: 00014221-00
Model: CT205
Type: LX800/DD256/CF512
Supply: 24VDC (18-34V); 25W
SN: 123456_001
LISTED 24NB
IND.CONT.EQ.
bachmann.
www.bachmann.info
Use only with Listed Class 2 Power Supply. For details see User Manual.
This class A digital apparatus is in compliance with FCC part 15 and with Canadian ICES-003.

Fig. 4: Type plate example

→ *Chapter 3.2.1 "Equipment", Page OI-10*

Customer label

The customer label contains all the important data relating to the status of the devices.

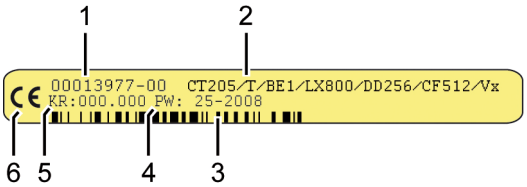


Fig. 5: Customer label example

1) Order number
2) Order code
3) Barcode with order number
4) Week of production
5) Design version
6) CE compliance

3.2 CPU module

The CPU module is the base module of the device. It contains all important hardware components (Processor, Chipset, RAM, etc.).

Additionally, the CPU module has an integrated power supply unit.

3.2.1 Equipment

Description	Specification
Processor	AMD Geode LX800
RAM	256 MB DDR SDRAM
NVRAM data storage	512 kByte SRAM, backup battery buffered
FLASH program memory	Internal 8 MB for system software
Drives	1 x CF (TYPE I) 512 MB
Interfaces	2 x Ethernet 10/100Mbit/s
	2 x USB 2.0
	1 x COM RS232 (reduced signal set), RS422 or RS485
	1 x CAN
Synchronizing pulse	Yes
Status LED	RUN, INIT, ERR

Tab. 2: Device equipment of CT205

When the power is off and a storage temperature above 0°C is maintained, the battery-backed NV-RAM retains the data for 3 months. Data loss may occur earlier if the storage temperature is in the range of -20 to 0°C. The recharging of an empty backup battery takes approx. 48 hours. If supplied by Bachmann electronic GmbH, it can be assumed that the battery has been discharged.

With dead storage batteries, the NVRAM is reformatted at the first boot process. The system clock settings will be reset. The ERROR LED will light up and the `SYS_MAIN: MSys-Software booting abortet` error message will be displayed on the console and entered into the logbook. On the next booting the CPU starts to work as usual, but with an empty NVRAM.

Depending on the application, the machine settings must be restored by means of a backup or set with meaningful initial values after formatting the NVRAM is formatted.

3.2.2 Interfaces

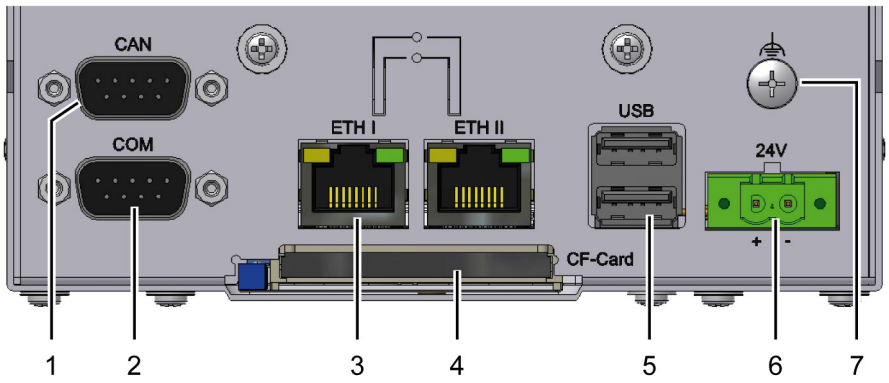


Fig. 6: Interfaces CT205

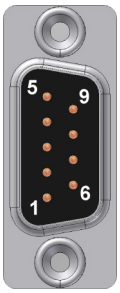
1) CAN interface
2) Serial interface COM
3) Ethernet interfaces
4) CF card slot
5) USB interfaces
6) Supply voltage
7) Grounding screw

3.2.2.1 Serial Interface

COM – RS232 /422/485

The interface is designed as an RS232 interface with a reduced signal set, RS422 or RS485.

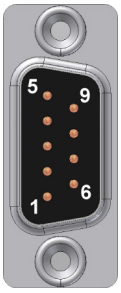
D-Sub 9 pin (male)

	Pin	Signal	RS232	RS422	RS485	Description
	1	TxD+	-	X	-	Transmit Data +
	2	RxD	X	-	-	Receive Data
	3	TxD	X	-	-	Transmit Data
	4	TxD-	-	X	-	Transmit Data -
	5	GND	X	X	X	Ground
	6	RxD+	-	X	-	Receive Data +
		RXD+/TXD +	-	-	X	Receive Data +/Transmit Data +
	7	RTS	X	-	-	Request to Send
	8	CTS	X	-	-	Clear to Send
	9	RxD-	-	X	-	Receive Data -
		RxD-/TxD-	-	-	X	Receive Data - / Transmit Data -

Tab. 3: Pin assignment for reduced RS232/RS422/RS485

3.2.2.2 CAN interface

D-Sub 9 pin (male)

	Pin	Signal	Description
	1	n. c.	not connected
	2	CAN_L	CAN_L Bus Line Dominant Low
	3	CAN_GND	CAN Ground
	4	n. c.	not connected
	5	(CAN_SHLD)	Optional CAN Shield
	6	GND	Optional Ground
	7	CAN_H	CAN_H Bus Line Dominant High
	8	n. c.	not connected
	9	(CAN_V+)	Optional CAN External Positive Supply

Tab. 4: Pin assignment for CAN connection

The signals shown in brackets are not used by the device and have no influence on the device function. They are only looped through between the connectors in order to ensure conformity with standards.

3.2.2.3 USB 2.0

The interfaces provide the option to upgrade the device with various hardware components.

The interface is used to connect USB users with a current draw of ≤ 500 A that cannot be operated using the standard USB interface.

USB

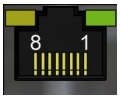
	Pin	Signal	Description
	1	+5 VDC	+5 VDC
	2	D-	Data -
	3	D+	Data +
	4	GND	Ground

Tab. 5: Pin assignment for USB connector

3.2.2.4 Ethernet RJ45 (10/100Base-T)

The device is equipped with two 10/100Mbit Ethernet connections.

RJ45

	Pin	Signal	Description
	1	TxD+	Transmit Data +
	2	TxD-	Transmit Data -
	3	RxD+	Receive Data +
	4	n. c.	not connected
	5		
	6	RxD-	Receive Data -
	7	n. c.	not connected
	8		

Tab. 6: Pin assignment for Ethernet socket

LED	Status	Description
Yellow	On	Connected to the 100Mbit network
	Off	Connected to the 10Mbit network or offline
Green	On	Network connection established (active link)
	Flashing	Data are sent or received.
	Off	Not connected to the network or offline

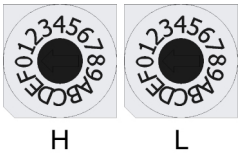
Tab. 7: Overview of status LEDs of the Ethernet interface

3.2.2.5 Hex rotary switches

The two 16-step Hex rotary switches **H**igh/**L**ow can be used to set different modes (RUN, TEST, PROG).

The switch setting at the time of delivery is **00**.

Hex rotary switches H/L

	Switch	Description
	H	High Nibble
	L	Low Nibble

Tab. 8: Hex rotary switches H/L

Mode

The switch setting can be used to operate the device in different modes.

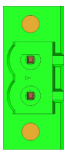
When the switch is set to **ED**, the device will boot automatically.

Further information about the different modes are described in M1 Operating Manual chapter "Switch Position CPU-ID".

3.2.2.6 Power supply

The connector for the supply voltage must be tightened with a torque of 0.5 to 0.6 Nm (UL508: 5 to 7 in lbs).

A 2 pin connector is provided for the +24 VDC supply of the device.

	Pin	Signal	Description
	1	+	+24 VDC
	2	-	Ground

Tab. 9: Pin assignment supply voltage

3.2.2.7 Power supply unit

This converts the input voltage (24 VDC) into the voltages which are required for the operation of the hardware components.

→ *Table 19 "Supply voltageCT205", Page OI-39*

3.2.3 CompactFlash card (CF card)

⚠ ATTENTION

Do not format CF card using Windows

Device will not boot

- Use M-Manager or Device Manager to format CF card.
- Request newly formatted CF card from Bachmann electronic GmbH.

NOTICE

CF card under voltage removing

Data loss

- Switch off the device or disconnect from the supply voltage.

The CF card is already formatted and contains the necessary system software. A change of this configuration by the customer is not needed.

The CF card is used for storage of the user specific software or data. It is available with memory sizes from 512 MB to 4 GB.

The CF card and the CF card slot of the device are mechanically coded so that the CF card cannot be inserted in the wrong way. The card can be used either in the CF card drive of a PC/Laptop or directly in the device.

The CF card is operated in the "True IDE" mode and therefore behaves like a standard hard disk. 3.3 V and also 5 V types may be used. The corresponding input voltage is automatically selected by the device.

Use only cards of Bachmann electronic GmbH or those which have been released.

Typical reading-/writing speed

File size 20 MB

Mode	Reading performance	Writing performance
PIO 4	1,482 kB/sec to 1,491 kB/sec	2,570.4 kB/sec to 2,758.7 kB/sec

Tab. 10: Typical reading-/writing speed CF card

3.3 Display module

The Display module contains the display, as well as the control electronics for the display.

To increase the lifetime of the display, the active phase of the backlight will be set as short as possible.

Operating displays based on TFT technology in continuous in operation and with no or little content change, may cause so called image sticking.

→ *Chapter 6.5 "Memory effect with TFT displays", Page OI-34*

3.3.1 Technical data

5.7" display

Display data	
Display diagonal	5.7"
Resolution	QVGA (320 x 240)
Number of colors	256 k (18 bit)
Luminance	typ. 350 cd/m^2
Dimming	—
Lighting	CCFL
Half brightness	≥ 50,000 h
Type	Touch resistive

Tab. 11: Display dataCT205

3.4 Front panel module

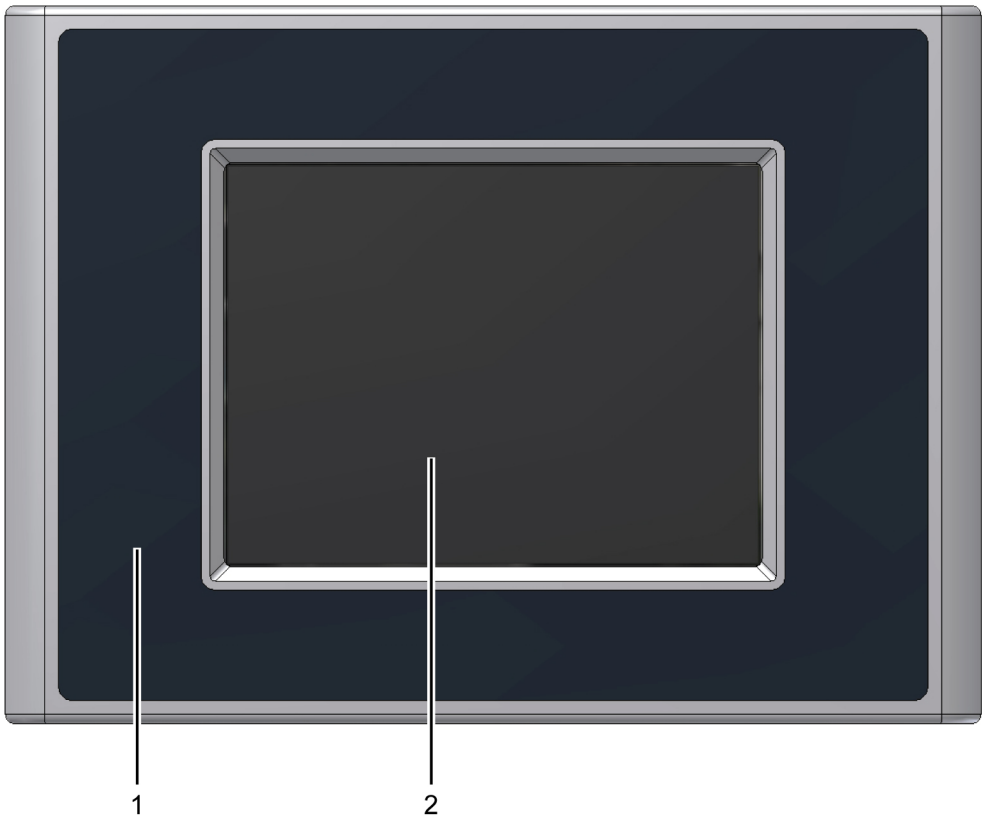


Fig. 7: Front panel CT205

1) Front panel

2) Display module

4 Installation

4.1 Transport, storage, unpacking

The following instructions for transport, storage and appropriate handling must be observed.

Transport

In spite of the robust structure, the integrated components are sensitive to severe shock and vibrations. Therefore, protect your device from major mechanical stress while transporting. Use the original packaging for shipping.

When transporting the device in cold weather or when it is subjected to extreme variation in temperature, make sure that no moisture (condensation) gets on or inside the device. Before initial operation the device must be completely dry. For this reason, an acclimatization period of at least two hours must be allowed for.

Storage

Compliance with climatic conditions according to the Chapter "Technical data" is required.

→ *Chapter 7.2, Page OI-39*

Unpacking

Procedure:

1. Check the packaging and contents for visible damage caused by transportation.
   ➔ Should you find damage caused by transportation, contact the transport company.
2. Do **not** throw away original packaging including the packaging material.
   Keep these items for later transport.
3. Always keep the supplied documents.
   These contain important informations regarding the handling your device.

4.2 Installation notes

The ambient conditions must be regard. (→ *Table 20, Page OI-40*)

The screws on the D-Sub connectors must be tightened.

The switch cabinet wall must be equipped with a sufficient installation cutout for the assembled device according to the device dimensions.

The material thickness at the installation cutout should be ≥ 2 mm.

→ *Chapter 7.3 "Dimensional drawings", Page OI-42*

For optimum interference protection, the device should be fixed to the place of installation.

The front panel must be seated flat on the bare (permanently conductive) mounting frame (e.g. on the machine).

The use of electrically conductive sealing material can improve contacting. Effects such as corrosion must be taken into account.

Type of fixing

Tension clamps are provided for installation. Hook the tension clamps into the openings on the device.

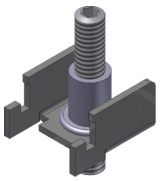


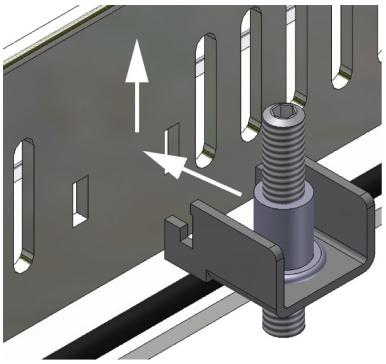
Fig. 8: Tensioning clamp

4.3 Installing the device

Installation in switch cabinet

Procedure:

1. Fit the device into the cut-out from the front.



2. Insert the tensioning clamps in the device and fasten them.
3. Fix the tensioning clamps by tightening the Phillips screws with a specified torque of 25 to 30 Ncm.

4.4 Grounding measures

Grounding must be carried out carefully and according to regulations in order to ensure the proper function of the device.

A low-impedance connection to the ground reduces the danger of an electrical surge in the event of a short circuit or defects in the system. Moreover, correct grounding and shielding of the cables reduce the effects of radiated interference on the system.

Functional ground

The functional ground ⏚ of the device is provided through the front panel by installation in the switch cabinet and connecting to the provided ground screw.

4.5 Cables

Install the supply cables and control cables in separate cable channels.

Supply voltage

A cable cross-section of 2.5 mm^2 and a cable length of ≤ 5 m is recommended. When using stranded wires, the ends must be fitted with ferrules.

The used connection cable must have a dielectric strength of ≥ 300 V.

For small cable lengths, it is also possible to use cable with a cross-section of ≥ 1.5 mm^2.

Copper wires must be used for connection cable with a temperature range of -30 °C to +80 °C.

Further information:

→ *Table 20 "Ambient conditions CT205", Page OI-40*

4.6 Shielding of signal cables

All cables except those used for the supply voltage must be shielded.

Cables are shielded to reduce the effects of magnetic, electrical and electro-magnetic interference.

Operating principle

Interference currents on cable shields are directed to the ground via the housing. To prevent these interference currents from becoming interference sources themselves, an electrically well conductive (low-impedance) connection to the ground is extremely important.

Suitable cables

Only cables with braided shields should be used. Cables with foil shields should be avoided, as they can easily be damaged through mechanical stress, which would reduce the shielding effect.

Grounding cable shields

Optimum interference suppression in the high frequency range can be achieved by grounding the shield cable at both ends.

Single-sided ground connections only provide attenuation at low frequencies.

However, positive effects may result, if

- no potential equalization cable can be used.
- Analog signals are transmitted (in the range µA to mA).
- Foil shields are used.

4.6.1 Connector wiring

For data cables with a serial coupling metallic or metallized connectors must be used. The shield of the data cable must be directly connected to the connector casing.

In case of potential differences between the grounding points an potential equalization current can flow through the double-connected shield. In this case an additional potential equalization must be provided.

4.7 Potential equalization

Differences in the potential may occur between separated parts of the system, which may result in high potential equalization currents, e.g. on a shield connected at both ends, with parts of the system grounded in different ways.

The cause for potential differences may be different mains feeds.

Potential equalization cable

By providing the potential equalization cable, the potential differences are reduced and correct function of electronic components is ensured.

- Proven cross-section: 4 mm^2
- Extensive connection to the ground (protective ground conductor)
- Pass the potential equalization cable as closely as possible to the signal cable

5 Getting started

The device is delivered with a pre-installed customer-specific software (BIOS, operating system and all necessary drivers etc.). When installing additional software please refer to the manual provided by the software manufacturer.

Requirements

Procedure:

1. Check the installation.
2. Connecting the necessary cables / devices (e.g. Ethernet, keyboard).
3. Connecting supply voltage.

Starting

The device does not have its own power switch.

Procedure:

1. Switch on the system.
   – or –
2. Connected the device to the supply voltage.

➔ The device will start up in a predefined state, which means the pre-installed application will start up.

Powering down

Procedure:

1. Shut down the device correctly.
   Otherwise can this lead to data loss!

Switch off the system

2. Switch off the system.
   Disconnected parts of the system must be protected against unintentional restart.
   – or –

Switch off the device

Requirements

If the device is part of a system, all parts of the system must first be switched off and the system must be disconnected.

Remove the connector of the fieldbus terminal.

3. Disconnect the device from the supply voltage.

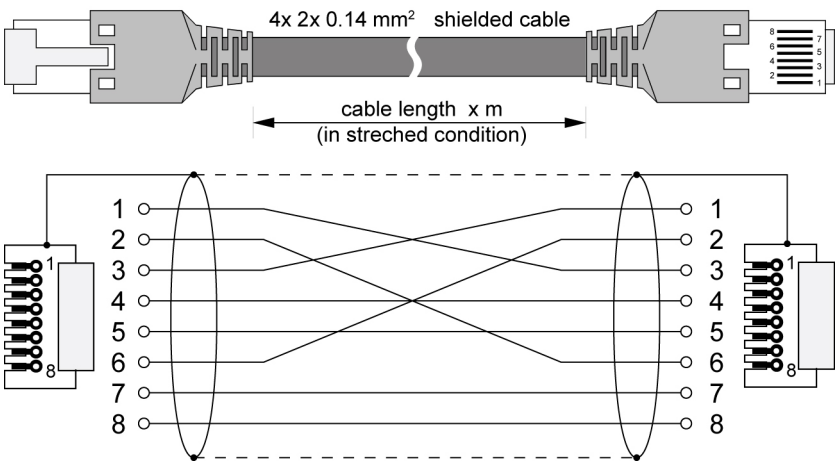
5.1 Application

To start an application on the device (visualization program), a Java software module must be created, configured and copied to the application directory. The Java Virtual Machine will then automatically start with the Java application when booting.

The topology of the Java software module is the same as described in the guideline M1 Reference Manual chapter "Guidelines for Software modules".

Installing the application

Procedure:



1. Connect the device using ETH I plug-in with projecting computer using crossed Ethernet cable.
2. Transfer the application using an FTP client (e.g. FileZilla) or M-Manager or the SolutionCenter.

   Further information on the M1 development tools chapter "M-Manager"

   – or –

   in M1 Development Tools chapter "Launch project" (VIS Designer)
3. Reboot device by removing the supply voltage.

6 Operation and service

6.1 BIOS settings

No settings or configurations are necessary in the BIOS.

6.2 Status indication

6.2.1 CPU module

There are 3 LED on the back of the CPU module that light up to indicate different operation modes.

Interrelationship between LED activity and operating status

RUN (green)	INIT (yellow)	ERR (red)	State
Off	Off	Off	Power off
Off	On	Off	Boot process running (approx. 10 to 15 seconds)
Off	On	On	Device in debug mode, waiting for command
On	Off	Off	Device booting finished successfully and ready
Off	Off	On	Booting terminated because of failure (see console messages)

Tab. 12: Overview of operating states

6.3 Error messages and troubleshooting

With every malfunction of the device check first if all cables are connected correctly.

If malfunctions have occurred that could not be corrected, please contact your technical service representative at Bachmann electronic GmbH.

With repairs please state the following:

- Serial number
- Type identification
- Short application description
- Detailed error description

Customer service

Bachmann electronic GmbH
Tel.: +43 (0)55 22/34 97-0
Fax: +43 (0) 55 22 / 34 97-102
E-Mail: service@bachmann.info

Device does not start

Symptom	Cause	Help
RUN LED will not light up	Supply voltage not connected or does not exist.	Check power cable. Check pin assignment power supply connection. (→ *Chapter 3.2.2.6, Page OI-15*)
	Power supply unit defective.	Return to manufacturer for repair.
	Supply voltage is outside of the permitted range.	Correct voltage range.
	Incorrect configuration	Turn Hex rotary switch to **ED** and reboot device. Device starts with default settings.

No picture

Symptom	Cause	Help
RUN LED lights up, device displays no picture.	Display defective.	Return to manufacturer for repair.

Touchscreen

Symptom	Cause	Help
Inputs are transferred incorrectly.	Touchscreen / driver software not calibrated	Calibrate the touchscreen.
	Duratouch is detected. Display electrically defective.	Return to manufacturer for repair.
Drift	Display has mechanical tension. or Defective display coating.	Return to manufacturer for repair.

6.4 Care

During the cleaning don't use any aggressive or abrasive cleansers.

Note the protection class of the front panel. (→ *Table 23, Page OI-41*)

6.4.1 Foil or front panel

Use a soft cloth to clean these parts. To remove persistent contamination, the cloth can be moisten with a little bit of commercial window cleaner.

The polyester foil and the contrast filter screen on the front panel are resistant to the following chemicals for a period of > 24 hours without visible changes according to DIN42115-2.

The foil or front plate are resistant to the following chemicals.

Chemicals
Ethyl alcohol, cyclohexanol, glycol, isopropanol, glycerine, methanol,
Acetaldehyde, aliphatic hydrocarbons, petrol, toluene, xylol, benzene,
Acetone, methyl-ethyl-ketone, dioxan,
Chlorofluorocarbons, perchlorethylene, 1.1.1 trichlorethene, trichlorethylene, ethylacetat, diethyl ether,
Ammonia < 2%, caustic soda < 2%, alkalicarbonates, bichromates, potassium ferrocyanides,
Chlornatron < 20%, hydrogen peroxide < 25%, potassium soap, detergent solutions (tenside), softeners,
Formic acid < 50%, acetic acid < 5%, phosphoric acid < 30%, hydrochloric acid < 10%, nitric acid < 10%,
Drilling coolants, diesel oil, varnish, paraffin oil, castor oil, silicon oil, turpentine substitute

Tab. 13: Resistance to chemicals

The polyester foil is resistant to vinegar for a period of ≤ 1 hours without visible damage according to DIN42115-2.

The foil or front panel is not resistant to the following chemicals.

Chemicals
Benzyl alcohol, methylene chloride
Concentrated mineral acids, concentrated alkaline solution, high-pressure steam > 100 °C

Tab. 14: Resistance to chemicals

6.5 Memory effect with TFT displays

Operating displays based on TFT technology in continuous in operation and with no or only little content change, may cause so called image sticking.

This behavior is influenced by different conditions (e.g. ambient temperature, switch on/off characteristics, number of image changes) so that an exact time of occurrence cannot be specified.

Reconditioning

This effect can be reversed in the long term by

- displaying a white image for a longer time

or

- changing the background color of the screen saver to white

A time duration should be chosen as is necessary to reverse the memory effect.

Preventive measures

This so-called **memory effect** can be prevented by changing images. Also, the standard functions of the operating system can be used.

Functions such as **Switching off the TFT display after a preset time** or **Using a monochrome screen saver** are measures that prevent the described effect.

6.6 Shut-down

Closure

Procedure:

1. Shut down the device.
2. Disconnect the device from the supply voltage.
3. Remove all cables/devices (e.g. Ethernet, keyboard).
4. Remove the device.

Storage

Use the original packaging for storage and take into account the climatic conditions.

→ *Table 20 "Ambient conditions CT205", Page OI-40*

Disposal

The device must be disposed of according to the applicable local environmental regulations for electronic devices.

7 Technical data and dimensional drawings

7.1 Interference resistance, UL approval

7.1.1 CE compliance

Electromagnetic compatibility EMC

The devices are intended as components for installation in machines and systems. Adherence to the installation instructions warrants compliance with the corresponding requirements for CE compliance of the entire machine/system equipped with such components based on the EMC Directive 2004/108/EC.

Generic standards: Immunity to interference industrial environments	According to EN61000-6-2	
Interference resistance against discharge of static electricity	Tested according to EN61000-4-2 Level 1-3 No malfunction or permanent impairment on the housing and all interfaces	
Interference resistance against high-frequency electromagnetic fields	Tested according to	
	EN61000-4-3	HF field, AM modulated: 80 MHz to 1 GHz, 10 V/m
	EN61000-4-6	HF asymmetrical, AM modulated: 150 kHz to 80 MHz, 10 V/m
Interference resistance to rapid transient electric disturbances (burst)	Supply tested according to EN61000-4-4 Level 3 Interfaces tested according to EN61000-4-4 Level 4	
Interference resistance to surge voltages	Supply tested according to EN61000-4-5 Level 1 Interfaces tested according to EN61000-4-5 Level 2	
Generic standards: Interference emission industrial environments	According to EN61000-6-4	
Interference emission, Radio interference	Tested according to EN55011 Class A	
Resistance to supply voltage failure (+24 VDC)	Tested according to IEC 1131-2 ≤ 10 ms/s without malfunction	

Tab. 15: Electromagnetic compatibility (EMC)

7.1.2 UL approval

The devices are certified as components for installation in machines and systems for the American and Canadian market.

To keep the UL508, each M-VIS device must be provided with a "UL Listed Class 2 power Supply".

UL standards	UL508:	UL508: UL Standard for Safety for Industrial Control Equipment
	UL508C:	UL508C: UL Standard for Safety for Power Conversion Equipment UL Standard
	UL840:	UL840: UL Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment

Tab. 16: UL standards

7.2 Technical data

Device equipment of

Equipment	Order number
CT205/T/BE1/LX800/DD256/CF512/Vx	00014221-00

Tab. 17: Device equipment / Order number CT205

Software

Operating system	VxWorks®

Tab. 18: Operating system CT205

Supply voltage

Nominal voltage	+24 VDC (SELV)
Input voltage range	18 to 36 VDC
Power consumption	≤ 25 W
Galvanic isolation	—
Reverse polarity protection	Implemented
Interference resistance	→ *Table 15 "Electromagnetic compatibility (EMC)", Page OI-37*
Buffer time at voltage breakdown	> 10 ms (EN601131-2 PS2)
Ripple	≤ 2.6 V_{ss} (100 Hz)
Fuse	Not accessible to customers

Tab. 19: Supply voltageCT205

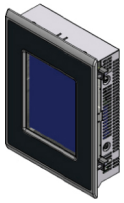
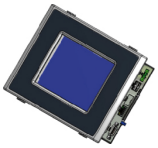
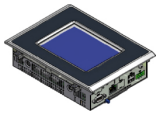
Ambient conditions

Operating temperature	→ *Table 21 "Operating temperature CT205", Page OI-41* Tested according to EN60068-2-14 (test Na and Nb) and UL508 This value refers to an ambient temperature measured at a distance of 10 cm to front, rear, top and bottom side, in quiet air and without exposing the device to any heat radiation.	
Storage temperature	-20 to +60 °C Tested according to EN60068-2-2 (test Bb) and EN60068-2-1 (test Ab)	
Relative humidity	5 to 95 %, without condensation	
Resistance to shocks	Tested according to EN60068-2-27 (test Ea)	
	Half-sine	15 g, 11 ms duration
	2 shocks per axis in all three directions	
Resistance to vibrations	Tested according to EN60068-2-6 (test Fc)	
	Sinusoidal	10 Hz to 57 Hz, 0.075 mm excursion
		58 Hz to 150 Hz with max. 1.0 g acceleration
	Sweep rate	1 octave/minute (±10%)
		10 sweep cycles per axis
Pollution degree	2	

Tab. 20: Ambient conditions CT205

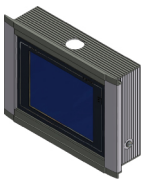
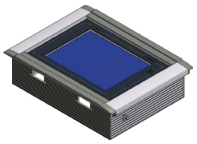
Installation position

Switch cabinet installation

Device type	Vertical	Interfaces		45 ° angle	Horizontal
		top	bottom		
CT205					
	0 to 50 °C	0 to 50 °C	0 to 50 °C	0 to 50 °C	0 to 45 °C

Tab. 21: Operating temperature CT205

Cabinet installation

Device type	Vertical	Horizontal
CT205		
	0 to 45 °C	0 to 40 °C
The operating temperature may deviate due to the configuration of the device.		

Tab. 22: Operating temperature CT205

Degree of protection

Front	CE: IP65
	UL/cUL: Type 1
Back	IP20

Tab. 23: Degree of protection CT205

7.3 Dimensional drawings

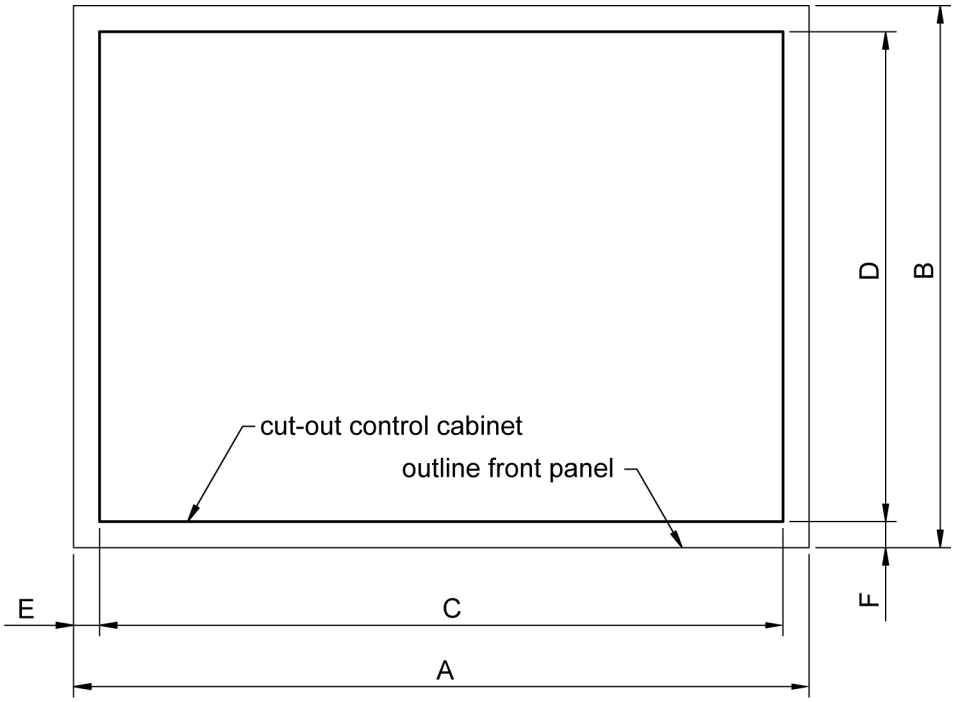


Fig. 9: Dimensions CT205

	Dimension [mm]	Weight
A (Width)	212	approx. 2 kg
B (Height)	156	
Depth	49	
C (Width)	197	
D (Height)	141	
E (Offset outline/cut-out)	7.5	
F (Offset outline/cut-out)	7.5	

Tab. 24: Dimensions / Weight CT205